Evaluation of Surfactant-stabilized Nanocrystalline Metallic Materials

Completed Technology Project (2017 - 2018)

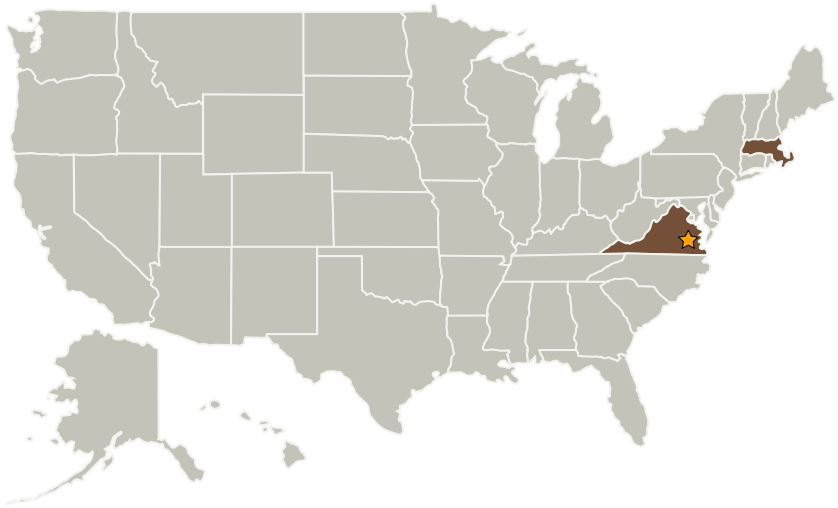
Project Introduction

What are the key technical challenges? The materials will be brittle and the microstructural features will be ultrafine. Generating valid data from mechanical testing and quantitative metallurgical analyses will be difficult. What is your approach/research plan? Procure NC-Cr and NC-W sheet materials from Veloxint Corp. Use PFIB to perform quantitative microstructural analyses Use ASTM specifications for ceramics to perform tensile, toughness and bending tests Correlate properties with microstructural characteristics What are the innovative aspects (how is this different than what others are doing in industry, academia, government)? Exploring nanocrystalline materials that are 3-5x stronger than traditional steels, and scaled-up to dimensions suitable for structural applications.

Anticipated Benefits

N/A

Primary U.S. Work Locations and Key Partners



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Center Innovation Fund: LaRC CIF

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Massachusetts Institute of Technology(MIT)	Supporting Organization	Academia	Cambridge, Massachusetts
Veloxint Corp	Supporting Organization	Industry	

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Center Innovation Fund: LaRC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

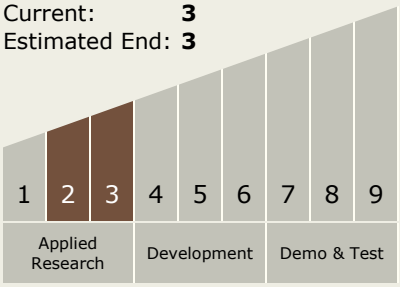
Julie A Williams-byrd

Principal Investigator:

Stephen J Hales

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials

Target Destination

Earth